



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,651	05/01/2006	Hisashi Matsuda	290428US3PCT	3206
22850	7590	01/08/2009	EXAMINER	
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			VERDIER, CHRISTOPHER M	
			ART UNIT	PAPER NUMBER
			3745	
			NOTIFICATION DATE	DELIVERY MODE
			01/08/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No. 10/577,651	Applicant(s) MATSUDA ET AL.	
	Examiner Christopher Verdier	Art Unit 3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-28 is/are pending in the application.
- 4a) Of the above claim(s) 25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16, 17, 19-24 and 26-28 is/are rejected.
- 7) ☒ Claim(s) 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 April 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 24, 2008 has been entered.

The claims have been amended to overcome the rejections under 35 USC 112, second paragraph set forth in the previous Office action. Correction of these matters is noted with appreciation.

Applicant's argument that in Kvasnak 6,419,446, the surfaces 52, 54 are not concave curved surfaces toward a height direction of the front edge portion of the blade body from a base portion on the upstream side of the flow of the working fluid, but rather a fillet 48 having a cusp, is not persuasive. Figure 2 and column 4, lines 19-39 of Kvasnak, for example, clearly disclose that surfaces 52, 54 are concave curved surfaces toward a height direction of the front edge portion of the blade body from a base portion on the upstream side of the flow of the working fluid.

Applicant's argument that in the publication "Controlling Secondary-Flow Structure by Leading-Edge Airfoil Fillet and Inlet Swirl to Reduce Aerodynamic Loss and Surface Heat Transfer", this publication also discloses a fillet, but not does not disclose or suggest a cover

Art Unit: 3745

portion formed as protruded portion having a concave curved surface towards a height direction of the front edge portion of the blade body from a base portion of the upstream side of the flow of the working fluid, is not persuasive. The publication clearly discloses a cover portion formed as protruded portion having a concave curved surface towards a height direction of the front edge portion of the blade body from a base portion of the upstream side of the flow of the working fluid, as seen in figures 2, 4, 7b, and 7c; page 2, column 2; page 3, column 1, lines 1-7; page 4, column 1, the last paragraph; and page 5, column 1, the last sentence of the second paragraph.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 23, line 2, “the root side” is unclear as to which element this refers to. It should also be introduced as -- a root side -- and by specifying which element this belongs to.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 3745

Claims 16-17, 19-22, and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Kvasnak 6,419,446. Disclosed is a turbine blade cascade structure comprising: a plurality of blades 26 having respective blade bodies 28 and provided in series on a wall surface 30, 32 in a circumferential direction; the wall surface connecting the blade bodies so that connected portions of the wall surface and blade bodies form corner portions, respectively; and a cover portion 38 disposed only at a portion near a front edge portion of each of the blade bodies corresponding to a flow of a working fluid in the corner portions, the cover formed to the connected portion, extending to an upstream side of the flow of the working fluid and formed as a protruded portion having a concave curved surface 52, 54 toward a height direction of the front edge portion of the blade body from a base portion on the upstream side of the flow of the working fluid. A root side at 30 and a tip side at 32 of the blade body are provided with the cover portion. The protruded portion having the concave curved surface is formed into a fan-like configuration that extends to a front side 60 and a back side 62 of the blade body with respect to a stagnation point 56 in a steady operation of the working fluid that collides against the front edge portion of the blade body. An angle θ of a sector of the protruded portion having the fan-like configuration with respect to the stagnation point in the steady operation of the working fluid that meets against the front edge portion of the blade body is measured to be 20 degrees. The protruded portion is raised from the upstream side to the height direction of the front edge portion of the blade body. The blade bodies are supported by a wall surface 30 at a root side of the blade bodies and a wall surface 32 at a tip side of the blade bodies. Concerning claim 21, which recites “which is formed by selecting one of a connecting piece that has been preliminarily made as an independent member, a machined piece together with the blade body, and a welded deposit”, this

Art Unit: 3745

is a product-by-process limitation. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product-by-process claim does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Concerning claim 28, the protruded portion forming the cover portion is formed from a single concave curved surface, since either the concave curved surface 52, 54 may be considered as a single concave curved surface, and the claim does not exclude there being two separate concave surfaces, since the claim is not limited by language such as “consisting of”.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

Art Unit: 3745

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 16-17, 19-22, and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the publication “Controlling Secondary-Flow Structure by Leading-Edge Airfoil Fillet and Inlet Swirl to Reduce Aerodynamic Loss and Surface Heat Transfer” (hereinafter referred to as “the publication”). The publication (figures 2, 4, 7b, and 7c; page 2, column 2; page 3, column 1, lines 1-7; page 4, column 1, the last paragraph; and page 5, column 1, the last sentence of the second paragraph) discloses a turbine blade cascade structure substantially as claimed, comprising: a plurality of blades having respective blade bodies and provided in series on a surface; a wall surface connecting the blade bodies so that connected portions of the wall surface and blade bodies form corner portions, respectively; and a cover portion (the fillet) disposed only at a portion near a front edge portion of each of the blade bodies corresponding to a flow of a working fluid in the corner portions, the cover formed to the connected portion, extending to an upstream side of the flow of the working fluid and formed as a protruded portion having a concave curved surface toward a height direction of the front edge portion of the blade body from a base portion on the upstream side of the flow of the working fluid. A tip side of the blade body is provided with the cover portion. The protruded portion having the concave curved surface is formed into a fan-like configuration that extends to a front side and a back side of the blade body with respect to a stagnation point in a steady operation of the working fluid that collides against the front edge portion of the blade body. The protruded portion is raised from the upstream side to the height direction of the front edge portion of the

Art Unit: 3745

blade body. The blade bodies are supported by a wall surface at a tip side of the blade bodies.

Concerning claim 21, which recites “which is formed by selecting one of a connecting piece that has been preliminarily made as an independent member, a machined piece together with the blade body, and a welded deposit”, this is a product-by-process limitation. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product-by-process claim does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). The wall surface for connecting the blade bodies is flat. The protruded portion forming the cover portion is formed from a single concave curved surface.

However, the publication does not disclose that the plurality of blades are provided on the wall surface in a circumferential direction (claim 16), and does not disclose that an angle θ of a sector of the protruded portion having the fan-like configuration with respect to the stagnation point in the steady operation of the working fluid that meets against the front edge portion of the blade body is measured to be 20 degrees (claim 20).

Kvasnak shows a turbine blade cascade having a plurality of blades 28 provided on a wall surface in a circumferential direction 30, 32, with an angle θ of a sector of a cover 38 having a protruded portion having a fan-like configuration with respect to a stagnation point 56 in the steady operation of the working fluid that meets against a front edge portion of a blade body

Art Unit: 3745

being 20 degrees, for the respective purposes of guiding working fluid in an annular flowpath to a turbine, and diverting high temperature core gas flow away from the portion where the leading edge of the airfoil abuts the wall surface, thus decreasing the pressure gradient and secondary core gas flow in the direction of walls 30, 32.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine blade cascade of the publication such that the plurality of blades are provided on the wall surface in a circumferential direction, and such that an angle θ of a sector of the protruded portion having the fan-like configuration with respect to the stagnation point in the steady operation of the working fluid that meets against the front edge portion of the blade body is measured to be 20 degrees, as taught by Kvasnak, for the respective purposes of guiding working fluid in an annular flowpath to a turbine, and diverting high temperature core gas flow away from the portion where the leading edge of the airfoil abuts the wall surface, thus decreasing the pressure gradient and secondary core gas flow in the direction of the wall.

Claims 23 and 27 (as far as claim 23 is definite and understood), are rejected under 35 U.S.C. 103(a) as being unpatentable over Kvasnak 6,419,446 in view of Tiemann 2002/0182067. Kvasnak discloses a turbine blade cascade substantially as claimed as set forth above, including the blade bodies being connected to the wall surface 30 at the root side, but does not disclose that the wall surface on the root side is formed as a straight downward inclined surface from the front edge portion of the blade bodies toward the upstream side as viewed from the front side of the

Art Unit: 3745

blade bodies (claim 23), and does not disclose that the wall surface for connecting the blade bodies is flat (claim 27).

Tiemann shows a turbine blade cascade having blade bodies 11a being connected to a wall surface at a root side near 52, with the wall surface on the root side formed as a straight downward inclined surface from the front edge portion of the blade bodies toward the upstream side as viewed from the front side of the blade bodies, with the wall surface for connecting the blade bodies being flat, for the purpose of supporting the turbine blade cascade and guiding working fluid to flow smoothly along the wall surface.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine blade cascade of Kvasnak such that the wall surface on the root side is formed as a straight downward inclined surface from the front edge portion of the blade bodies toward the upstream side as viewed from the front side of the blade bodies, and such that the wall surface for connecting the blade bodies is flat, as taught by Tiemann, for the purpose of supporting the turbine blade cascade and guiding working fluid to flow smoothly along the wall surface.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kvasnak 6,419,446 in view of Pearce 3,959,966. Kvasnak discloses a turbine blade cascade substantially as claimed as set forth above, including the blade bodies being connected to the wall surface 30 at the root side, but does not disclose that the wall surface on the root side is formed as a

Art Unit: 3745

downward inclined curved surface from an intermediate portion of the blade bodies toward the upstream side of the front edge portion as viewed from the front side of the blade bodies.

Pearce shows a turbine blade cascade having blade bodies 13 connected to a wall surface 32 at a root side, with the wall surface on the root side formed as a downward inclined curved surface from an intermediate portion of the blade bodies toward the upstream side of the front edge portion (near 43) as viewed from the front side of the blade bodies, for the purpose of supporting the turbine blade cascade and guiding working fluid to flow smoothly along the wall surface.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine blade cascade of Kvasnak such that the wall surface on the root side is formed as a downward inclined curved surface from an intermediate portion of the blade bodies toward the upstream side of the front edge portion as viewed from the front side of the blade bodies, as taught Pearce, for the purpose of supporting the turbine blade cascade and guiding working fluid to flow smoothly along the wall surface.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kvasnak 6,419,446 in view of Crossley 3,843,279. Kvasnak discloses a turbine blade cascade substantially as claimed as set forth above, including the blade bodies connected to the wall surface 32 at the tip side, but does not disclose that the wall surface on the tip side is formed as

Art Unit: 3745

an upward inclined curved surface curved from an intermediate portion of the blade bodies toward the front edge portion of the upstream side.

Crossley shows a turbine blade cascade having blade bodies 14a connected to a wall surface 22 at a tip side, with the wall surface on the tip side formed as an upward inclined curved surface curved from an intermediate portion of the blade bodies toward the front edge portion of the upstream side, for the purpose of supporting the turbine blade cascade and guiding working fluid to flow smoothly along the wall surface.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine blade cascade of Kvasnak such that the wall surface on the tip side is formed as an upward inclined curved surface curved from an intermediate portion of the blade bodies toward the front edge portion of the upstream side, as taught by Crossley, for the purpose of supporting the turbine blade cascade and guiding working fluid to flow smoothly along the wall surface.

Allowable Subject Matter

Claim 18 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Art Unit: 3745

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christopher Verdier/
Primary Examiner, Art Unit 3745

Christopher Verdier
Primary Examiner
Art Unit 3745